Dr. Yunlong Wang

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Research Interests

Pattern Recognition, Machine Learning, Light field Photography, and Biometrics.

Academic Positions

- **Associate Professor** since Apr. 2022
  Center for Research on Intelligent Perception and Computing (CRIPAC),
  Institute of Automation, Chinese Academy of Sciences (CASIA)
- **Assistant Professor** Jul. 2019 - Mar. 2022
  Center for Research on Intelligent Perception and Computing (CRIPAC),
  Institute of Automation, Chinese Academy of Sciences (CASIA)

Education

- **Doctor of Engineering** Aug. 2014 - Jun. 2019
  University of Science and Technology of China (USTC)
  Hefei, Anhui, China
  Supervisor: Prof. Tieniu Tan
  Thesis title: Light Field Image Enhancement and Recognition
- **Bachelor of Engineering (honors program)** Aug. 2010 - Jun. 2014
  University of Science and Technology of China (USTC)
  Hefei, Anhui, China
  Thesis title: Image-based Automatic Object Counting Techniques

Projects and Funds

- **Iris Liveness Detection and Recognition Based on Hybrid Light Field Imaging**
  Youth Fund Project of National Natural Science Foundation of China, Jan. 2021 – Dec. 2023
- **Computational Imaging Techniques for High-throughput Iris Recognition**
  General Program of National Natural Science Foundation of China, Jan. 2021 – Dec. 2024
- **Large-scale Iris Image Generation**
  General Program of National Natural Science Foundation of China, Jan. 2022 – Dec. 2025
- **Federated Learning for Biometrics Recognition**
  CAAI-Huawei Mindspore Open Fund, Jan.2022 – Oct.2022
- **Smart Iris Recognition Systems**
  Repository: https://www.researchgate.net/project/Research-on-Smart-Iris-Recognition-systems, since Jul. 2019
- **Computational Light Field Imaging Devices and Algorithms**
  Repository: https://www.researchgate.net/project/Computational-Light-Field-Imaging-Devices-and-Algorithms, since Oct. 2016

Awards and Honors

- Young Elite Scientist Sponsorship Program by the Beijing Association for Science and Technology (BAST), 2023-2025.
- The second prize of Technology Invention Award of China Society of Image and Graphics (CSIG), 2022.
- Excellent Paper of Journal of Image and Graphics (JIG), 2022.
- Best Paper Award Runner-up, International Joint Conference on Biometrics (IJCB), 2020.

Professional Activity

- **Reviewing**
  Journals: IEEE TIP, IEEE TIFS, IEEE TCSVT, IEEE TCI, IEEE TVCG, IEEE JSTSP, IEEE TBIOM, IEEE SPL, IEEE/CAA JAS, Neurocomputing.
  Conferences: CVPR, ICCV, AAAI, IJCB, CCBR.
- **Organizing committee**
  "NIR Iris Challenge Evaluation in Non-cooperative Environments: Segmentation and Localization" Competition at IJCB 2021
  PC member of CCBR 2019, 2021, 2022
- **Invited talks**
  Beijing University of Civil Engineering and Architecture, China.
  Hosted by Assistant Professor Caiyong Wang, Nov. 2022
  Beijing University of Posts and Telecommunications, China.
  Hosted by Prof. Zhaofeng He, Dec. 2021
  Beijing Normal University, China.
  Hosted by Prof. Yongzhen Huang, Aug. 2021

Publications

- **Journal Paper**

  [1] Multiscale Dynamic Graph Representation for Biometric Recognition with Occlusions.
  Min Ren, **Yunlong Wang***, Yuhao Zhu, Kunbo Zhang, Zhenan Sun.
  IEEE Transactions on Pattern Analysis and Machine Intelligence (**T-PAMI**), minor revision, 2022.

  [2] IrisGuideNet: Guided Localization and Segmentation Network for Unconstrained Iris Biometrics
  Jawad Muhammad, Caiyong Wang, **Yunlong Wang**, Kunbo Zhang, Zhenan Sun.
  IEEE Transactions on Information Forensics and Security (**TIFS**), 2023.

  [3] Contextual Measures for Iris Recognition.
  Jianze Wei, **Yunlong Wang***, Huaibo Huang, Ran He, Zhenan Sun, Xingyu Gao*.
  IEEE Transactions on Information Forensics and Security (**TIFS**), 2023.

  [4] Federated Local Compact Representation Communication: Framework and Application
  Zhengquan Luo, **Yunlong Wang**, Zilei Wang.
  Machine Intelligence Research (**MIR**), 2023.

  [5] Boosting multi-modal ocular recognition via spatial feature reconstruction and unsupervised image quality estimation
  Zihui Yan, Lingxiao He, **Yunlong Wang**, Kunbo Zhang, Zhenan Sun.
  Machine Intelligence Research (**MIR**), 2022.

  [6] CASIA-Iris-Africa: A Large-scale African Iris Image Database

Jawad Muhammad, Yunlong Wang, Junxing Hu, Kunbo Zhang, Zhenan Sun.
Machine Intelligence Research (**MIR**), 2022, accepted.

[7] Perturbation Inactivation Based Adversarial Defense for Face Recognition.
Min Ren, Yuhao Zhu, **Yunlong Wang***, Zhenan Sun.
IEEE Transactions on Information Forensics and Security (**TIFS**), 2022.

[8] Combining 2D texture and 3D geometry features for Reliable iris presentation attack detection using light field focal stack.
Zhengquan Luo, **Yunlong Wang***, Nianfeng Liu, Zilei Wang.
IET Biometrics, 2022.

[9] Towards Interpretable Defense against Adversarial Attacks via Causal Inference.
Min Ren, **Yunlong Wang***, Zhaofeng He.
Machine Intelligence Research (**MIR**), 2022.

[10] Towards More Discriminative and Robust Iris Recognition by Learning Uncertain Factors.
Jianze Wei, Huaibo Huang, **Yunlong Wang***, Ran He, Zhenan Sun.
IEEE Transactions on Information Forensics and Security (**TIFS**), 2022.

[11] Multitask Deep Active Contour-based Iris Segmentation for Off-Angle Iris Images.
Tianhao Lu, Caiyong Wang, **Yunlong Wang**, Zhenan Sun.
Journal of Electronic Imaging (**JEI**), 2022.

[12] Overview of biometrics research (in Chinese).
Zhenan Sun , He Ran , Liang Wang, ..., **Wang Yunlong** , others.
Journal of Image and Graphics (**JIG**), 2022.

[13] Cross-spectral Iris Recognition by Learning Device-specific Band.
Jianze Wei, **Yunlong Wang**, Yi Li, Ran He, Zhenan Sun.
IEEE Transactions on Circuits and Systems for Video Technology (**TCSVT**), 2021.

[14] CASIA-Face-Africa: A Large-scale African Face Image Database.
Muhammad Jawad, **Yunlong Wang**, Caiyong Wang, Kunbo Zhang, Zhenan Sun.
IEEE Transactions on Information Forensics and Security (**TIFS**), 2021.

[15] High-fidelity View Synthesis for Light Field Imaging with Extended Pseudo 4DCNN.
Yunlong Wang, Fei Liu, Kunbo Zhang, Zilei Wang, Zhenan Sun, Tieniu Tan.
IEEE Transactions on Computational Imaging (**TCI**), 2020.

[16] Flexible Iris Matching Based on Spatial Feature Reconstruction.
Zihui Yan, Lingxiao He, **Yunlong Wang**, Zhenan Sun, Tieniu Tan.
IEEE Transactions on Biometrics, Behavior, and Identity Science (**TBIOM**), 2021.

[17] Towards Complete and Accurate Iris Segmentation Using Deep Multi-task Attention Network for Non-Cooperative Iris Recognition.
Caiyong Wang, Jawad Muhammad, **Yunlong Wang**, Zhaofeng He and Zhenan Sun.
IEEE Transactions on Information Forensics and Security (**TIFS**), 2020.

[18] ScleraSegNet: An Attention Assisted U-Net Model for Accurate Sclera Segmentation.
Caiyong Wang, **Yunlong Wang**, Yunfan Liu, Zhaofeng He, Ran He and Zhenan Sun.
IEEE Transactions on Biometrics, Behavior, and Identity Science (**TBIOM**), 2020.

[19] Binocular Light-Field: Imaging Theory and Occlusion-Robust Depth Perception Application.
Fei Liu, Shubo Zhou, **Yunlong Wang**, Zhenan Sun, Tieniu Tan.

IEEE Transactions on Image Processing (**TIP**), 2019.

[20] Iris Liveness Detection Based on Light Field Imaging.
Ping Song, Ling Huang, **Yunlong Wang**, Fei Liu, Zhenan Sun.
IEEE/CAA Journal of Automatica Sinica (**JAS**), 2019.

[21] LFNet: A Novel Bidirectional Recurrent Convolutional Neural Network for Light-Field Image Super-Resolution.
Yunlong Wang, Fei Liu, Kunbo Zhang, Guangqi Hou, Zhenan Sun, Tieniu Tan.
IEEE Transactions on Image Processing (**TIP**), 2018.

- **Conference full paper**

[1] PDVN: A Patch-based Dual-view Network for Face Liveness Detection using Light Field Focal Stack.
Yunlong Wang, Mupei Li, Zhengquan Luo, Zhenan Sun.
International Joint Conference on Biometrics (**IJCB**), 2022.

[2] D-ESRGAN: A Dual-Encoder GAN with Residual CNN and Vision Transformer for Iris Image Super-Resolution.
Caiyong Wang, Tianhao Lu, Gaosheng Wu, **Yunlong Wang**, Zhenan Sun.
International Joint Conference on Biometrics (**IJCB**), 2022.

[3] Disentangled Federated Learning for Tackling Attributes Skew via Invariant Aggregation and Diversity Transferring.
Zhengquan Luo , **Yunlong Wang*** , Zilei Wang , Zhenan Sun , Tieniu Tan.
International Conference on Machine Learning (**ICML**), 2022.

[4] FedIris: Towards More Accurate and Privacy-preserving Iris Recognition via Federated Template Communication.
Zhengquan Luo, **Yunlong Wang*,** Zilei Wang, Zhenan Sun, Tieniu Tan.
Computer Vision and Pattern Recognition Workshops (**CVPRW**), 2022.

[5] Learning Instance-level Spatial-Temporal Patterns for Person Re-identification.
Min Ren, Lingxiao He, Xingyu Liao, Wu Liu, **Yunlong Wang**, Tieniu Tan.
International Conference on Computer Vision (**ICCV**), 2021.

[6] NIR Iris Challenge Evaluation in Non-cooperative Environments: Segmentation and Localization.
Caiyong Wang, **Yunlong Wang**, Kunbo Zhang, Jawad Muhammad, Tianhao Lu, Qi Zhang, Qichuan Tian, Zhaofeng He, Zhenan Sun.
International Joint Conference on Biometrics (**IJCB**), 2021.

[7] A Large-scale Database for Less Cooperative Iris Recognition.
Junxing Hu, Leyuan Wang, Zhengquan Luo, **Yunlong Wang***, Zhenan Sun.
International Joint Conference on Biometrics (**IJCB**), 2021.

[8] An End-to-End Autofocus Camera for Iris on the Move.
Leyuan Wang, Kunbo Zhang, **Yunlong Wang**, Zhenan Sun.
International Joint Conference on Biometrics (**IJCB**), 2021.

[9] Iris Normalization Beyond Appr-Circular Parameter Estimation.
Zhengquan Luo, Haiqing Li, **Yunlong Wang**, Zilei Wang, Zhenan Sun.
Chinese Conference on Biometric Recognition (**CCBR**), 2021.

[10] A Novel Deep-learning Pipeline for Light Field Image Based Material Recognition.
Yunlong Wang, Kunbo Zhang, Zhenan Sun.

International Conference on Pattern Recognition (**ICPR**). 2021.

[11] A Lightweight Multi-Label Segmentation Network for Mobile Iris Biometrics.
Caiyong Wang, **Yunlong Wang**, Boqiang Xu, Yong He, Zhiwei Dong, Zhenan Sun.
International Conference on Acoustics, Speech, and Signal Processing (**ICASSP**), 2020.

[12] Dynamic Graph Representation for Occlusion Handling in Biometrics.
Min Ren, **Yunlong Wang**, Zhenan Sun, Tieniu Tan.
Thirty-Fourth AAAI Conference on Artificial Intelligence (**AAAI**), 2020.

[13] Recognition Oriented Iris Image Quality Assessment in the Feature Space.
Leyuan Wang, Kunbo Zhang, Min Ren, **Yunlong Wang**, Zhenan Sun.
International Joint Conference on Biometrics (**IJCB**), 2020.

[14] All-in-Focus Iris Camera with a Great Capture Volume.
Kunbo Zhang, Zhenteng Shen, **Yunlong Wang**, Zhenan Sun.
International Joint Conference on Biometrics (**IJCB**), 2020.
Best Paper Award Runner-up

[15] SSBC 2020: Sclera Segmentation Benchmarking Competition in The Mobile Environment.
Junxing Hu, Yonghe He, Caiyong Wang, Hui Liu, **Yunlong Wang**, Zhenan Sun.
International Joint Conference on Biometrics (**IJCB**), 2020.

[16] Alignment Free and Distortion Robust Iris Recognition.
Min Ren, Caiyong Wang, **Yunlong Wang**, Zhenan Sun, Tieniu Tan.
International Conference on Biometrics (**ICB**), 2019.

[17] Cross-Sensor Iris Recognition Using Adversarial Strategy and Sensor-Specific Information.
Jianze Wei, **Yunlong Wang**, Xiang Wu, Zhaofeng He, Ran He, Zhenan Sun.
International Conference on Biometrics: Theory, Applications and Systems (**BTAS**), 2019.

[18] End-to-end View Synthesis for Light Field Imaging with Pseudo 4DCNN.
Yunlong Wang, Fei Liu, Zilei Wang, Guangqi Hou, Zhenan Sun, Tieniu Tan.
European Conference on Computer Vision (**ECCV**), 2018.

[19] A Simple and Robust Super Resolution Method For Light Field Images.
Yunlong Wang, Guangqi Hou, Zhenan Sun, Zilei Wang, Tieniu Tan.
International Conference on Image Processing (**ICIP**), 2016.

[20] 4D Light-Field Sensing System for People Counting.
Guangqi Hou, Chi Zhang, **Yunlong Wang**, Zhenan Sun.
Photonic and Optoelectronic Integrated Circuits XVIII (**SPIE OPTO**), 2016.

Patents

[1] Zhengquan Luo, Zhenan Sun, Yunlong Wang, “Iris Image Feature Extraction Method and System Based on Federated Learning, And Apparatus”, PCT/CN2021/092794, publication date 05/10/2021.

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